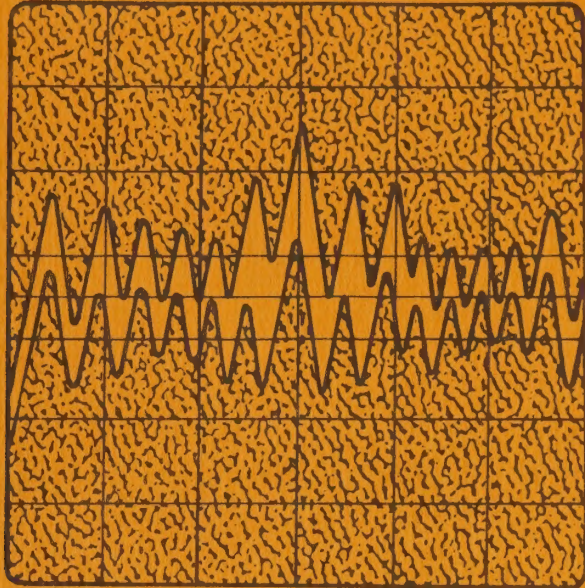


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INSTITUTE OF GOVERNMENT
STUDIES

JUN 11 1976

UNIVERSITY OF CALIFORNIA

city planning

Noise abatement
Fremont

FREMONT GENERAL PLAN NOISE ELEMENT

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NOISE ELEMENT

of the

FREMONT GENERAL PLAN

June, 1975

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RESOLUTION NO. 3678

RESOLUTION OF THE CITY COUNCIL OF
THE CITY OF FREMONT AMENDING THE
GENERAL PLAN OF THE CITY OF FREMONT
BY THE ADOPTION OF A NOISE ELEMENT
AND BY THE AMENDMENT OF THE GENERAL
PLAN POLICY TEXT TO SET FORTH OBJEC-
TIVES, PRINCIPLES AND ACTION PROGRAM
FOR SAID NOISE ELEMENT.

WHEREAS, pursuant to Section 65302 of the Government Code of the State of California it is required that each city adopt a Noise Element; and

WHEREAS, there has been prepared a proposal (GPA-74-4) to amend the General Plan of the City of Fremont by adoption of a certain document entitled "Noise Element of the Fremont General Plan" as shown and set forth in Exhibit "A" attached hereto and made a part hereof, including those said maps designated as Exhibits 1 through 5 inclusive of said document; and

WHEREAS, there has also been proposed in connection therewith a certain amendment to the General Plan, Policy Text consisting of Objectives, Principles and Action Program of the Noise Element of the General Plan, as shown and set forth in Exhibit "B" attached hereto and made a part hereof; and

WHEREAS, the Planning Commission, pursuant to law, has held a public hearing on said proposed amendment to the General Plan and General Plan, Policy Text, and did certify its findings and recommendations to the city council; and

WHEREAS, the City Council, pursuant to law, has held a public hearing on the proposed amendment to the General Plan and to the General Plan, Policy Text, and did consider said proposed amendments, recommendations and findings of the Commission;

NOW THEREFORE, BE IT RESOLVED, that the City Council of the City of Fremont does hereby adopt the said proposals as

set forth above and in Exhibits "A" and "B" as amendments to the General Plan and amendments to the Policy Text of the General Plan, said document including five certain maps designated therein as 1 through 5, inclusive, to be officially designated as the Noise Element of the General Plan of the City of Fremont, pursuant to Section 65302 of the Government Code of the State of California;

BE IT FURTHER RESOLVED that the Fremont General Plan, Policy Text shall be amended in particular by the addition of Item "I" to Section III. City Wide Policies; said item to be entitled "Noise Element" and to contain the text of said Objectives, Principles and Action Program as set forth in said Exhibit "B".

ADOPTED June 10, 1975 by the City Council of the City of Fremont, by the following vote, to wit:

AYES: Councilmen Dillon, Lampert, Mezzetti, Steel, Rhodes
NOES: None
ABSENT: None

Gene Rhodes
Mayor

ATTEST:

Robert A. Yell
City Clerk

APPROVED AS TO FORM:

Theodore R. Bresler
Assistant City Attorney

PREFACE

Sounds are a part of our everyday existence. We are dependent on activities which generate sounds — the automobile, the factory, tractors, machines, alarm clocks, sirens and so forth. Since sound is a form of energy, all activities generate sounds. These sounds vary from the faint to the loud, from low pitched to high pitched, from long to short, from "normal" to unusual. Normal sounds we take for granted. Abnormal, loud, or startling sounds, we often respond to as noise-unwanted sound or sound of negative value.

As individuals, we have evolved ways of dealing with noise. We avoid noises as much as possible and protest when unwanted noises intrude on our activities. A house in a quiet neighborhood is a highly valued commodity. A night of interrupted sleep is an annoyance. Several nights of interrupted sleep becomes the basis for calmly "speaking" to the offending neighbors. We anticipate other people's desires and avoid lawn mowing at the crack of dawn. We make allowances for special circumstances — the neighbor who hammers late to finish a weekend project. We tolerate noises that seem worth it — the noise of the automatic dishwasher. These are all ways that we as individuals deal personally with noise.

As a community, some noises can't be adequately dealt with on an individual, personal and informal basis. The noise of traffic is not produced by direct neighbors. The amount of activity which can generate noise in a community is many times greater than that in any one neighborhood. A more impersonal attitude characterizes relationships. Public or corporate groups, rather than a few individuals, may be responsible for generating noise and be the recipient of noise. Protests and complaints are dealt with more formally and are more time consuming. Actions to reduce noises may take agreement from more than one body some of whom are "non-residents" — regional offices, State or Federal agencies. For reasons such as these, it is necessary to take a community approach to dealing with noise.

The Noise Element of the General Plan is a means by which the community can identify its desires for noise maintenance or reduction and can establish a program for carrying out these desires.

PROGRAM

Objectives

1. The protection of persons from health hazards, the protection of activities from intrusions, and the protection of property from losses due to excessive noise levels.
2. The adoption of noise policies and programs which will prepare the community to deal with increasing noise levels due to community growth and the intensification of noise producing activities.
3. The coordination of local noise reduction policies and programs with those of Federal, State and regional agencies.
4. The balancing of the community's noise objectives with its other planning and development objectives.

Principles

1. The following set of noise levels are established as community standards for major land use and activity categories:

NOISE COMPATIBILITY STANDARDS IN CNEL VALUES BY LAND USE CATEGORIES

Noise Compatibility Standards (in dBA)

<u>Land Use Categories</u>	<u>Clearly Acceptable</u>	<u>Normally Acceptable</u>	<u>Normally Unacceptable</u>	<u>Clearly Unacceptable</u>
Group I (residential, schools, hospitals, and neighborhood parks)	up to 60	60-65	65-75	above 75
Group II (offices, retail, sensitive industries)	up to 65	65-75	75-80	above 80
Group III (industries, wholesale)	up to 70	70-80	80-85	above 85

2. For Group I land uses, interior noise levels of 45 dBA or less (CNEL with windows closed resulting from exterior noise sources) shall be established as standard.
3. Technological solutions (e.g., the construction of barriers, elevation or depression of roadways, site planning) shall be preferred to land use change solutions to avoid impacting planned land uses with excessive noise.
4. Efforts to bring existing development into conformity with acceptable standards shall be made through the seeking of Federal and State allocations for noise attenuation programs.

Action Program

1. Amend the Fremont Municipal Code to require that all new residential development within 500 feet on either side of any thoroughfare, freeway, or mass transit line, shown on the Circulation Element of the General Plan, or within 500 feet on either side of a railroad line, shall make on-site noise measurements to determine existing and predicted noise levels and that noise attenuation features be incorporated in the design of those residential areas found to exceed adopted standards.
2. Amend the Fremont Municipal Code to require that feasible mitigating measures identified by an EIR become incorporated at the time of project execution.
3. Evaluate the Fremont Municipal Code to determine the noise compatibilities between the land uses permitted by each zoning district.
4. Investigate the desirability of adopting a Noise Control Ordinance patterned after the Model Noise Ordinance prepared by the League of California Cities.
5. Conduct a Community Noise Survey utilizing the voluntary services of the Scientific Advisory Group for Environmental Services in order to determine more accurately existing noise levels and to define typical ambient noise levels in a spectrum of land use environments.
6. Initiate in the City an on-going noise measurement program for the purpose of indicating changes in noise levels over time, and to permit low cost spot measurements related to City projects.
7. Observe and respond, as the circumstances warrant, to actual or potential noise level increases resulting from land uses and activities located outside the City limits such as airports and other transportation facilities.
8. Prepare a brochure to inform homeowners of the means available to limit noise intrusions and of City code requirements for improvements such as the construction of sound barrier fences.
9. Complete the City's planned thoroughfare system so that the bulk of noise resulting from traffic will be contained on streets planned for higher volumes.
10. Continue to evaluate truck routes for modifications in response to changes in truck traffic volume and/or adjacent land uses.
11. Continue to include noise attenuation considerations in applications for Federal highway funds.
12. Upon completion of the City Council authorized Freeway Deletion Traffic Study, revise the maps and tables in the Noise Element to reflect predicted future traffic volumes.
13. Coordinate the Public Facilities and Recreation Elements of the General Plan with the noise level information of the Noise Element.

INTRODUCTION

A concern with protecting the community from the intrusion of undesirable noise is consistent with the basic premises upon which much local planning is founded. Rooted in the 1800's are concerns with protecting the public health, safety, and property from problems of congestion, blight, pollution, smoke, and noise. Police power measures such as zoning have grown out of purposes such as these. Zoning ordinances deal with noise problems typically by permitting compatible uses to develop within the same zone while other incompatible uses are excluded. More recently performance standards and impact zoning have been used as devices to supplement the more standard code's ability to regulate potential nuisance uses. Some communities in California, as well as elsewhere,¹ have adopted ordinances aimed at controlling noise from its local source.

Because noises often cross municipal boundaries and because many of the powers necessary to regulate noises rest with the Federal and State governments, noise control must be approached intergovernmentally. Noise associated with inter-state commerce is dealt with at the Federal level. Many Federal programs² are focused in the Office of Noise Abatement and Control within the Environmental Protection Agency. Other programs emanate from the Departments of Transportation, Labor, Housing and Urban Development. The State of California³ is active in regulating airport noise levels, motor vehicles including motorcycles, occupational safety related to noise, and sound insulation in non-single family detached housing.

Though these several kinds of programs at Federal and State levels aimed at reducing and controlling noise have recently come into effect, significant gaps are left which can best be dealt with by local communities through their current and long range planning processes.

The close relationship between noise and the other elements of the General Plan is clear. The Land Use Element establishes the location, type, and intensity of activity within the City. These land uses act as noise generators as well as recipients of noise. The Circulation Element lays out the City's thoroughfare and freeway system. Traffic is the dominant source of noise in most communities. The Public Facilities and Recreation Elements establish locations for school and park sites. Schools and parks require quiet environments. The Conservation Element identifies resources which need protection. Added energy may be consumed for mechanical cooling in structures sealed against noise. The Scenic Highway and Route Element identifies those roadways in the City having particular scenic values. If sound barriers were erected along these routes, scenic values might be sacrificed. In order to relate these kinds of community noise considerations to the other elements of the City's General Plan, a Noise Element is necessary.

AUTHORITY

In recognition of the need to incorporate noise considerations into the General Planning process, the State Legislature in 1971 enacted a law requiring that all cities and counties adopt a Noise Element of the General Plan. Government Code (Section 65302g) requires:

"A noise element in quantitative, numerical terms, showing contours of present and projected noise levels associated with all existing and proposed major transportation elements. These include but are not limited to the following:

- "1. Highways and freeways
- "2. Ground rapid transit systems
- "3. Ground facilities associated with all airports operating under a permit from the State Department of Aeronautics.

"These noise contours may be expressed in any standard acoustical scale which includes both the magnitude of noise and frequency of its occurrence. The recommended scale is sound level A, as measured with the A-weighting network of a standard sound level meter, with corrections added for the time duration per event and the total number of events per 24-hour period.

"Noise contours shall be shown in minimum increments of five decibels and shall be continued down to 65 db(A). For regions involving hospitals, rest homes, long-term medical or mental care, or outdoor recreational areas, the contours shall be continued down to 45 db(A).

"Conclusions regarding appropriate site or route selection alternatives or noise impact upon compatible land uses shall be included in the general plan.

"The state, local, or private agency responsible for the construction or maintenance of such transportation facilities shall provide to the local agency producing the general plan, a statement of the present and projected noise levels of the facility, and any information that was used in the development of such levels."

PURPOSE

The purposes of the Noise Element of the Fremont General Plan are to:

1. Increase community awareness of the need to plan to control noise, especially as the City increases the size and intensity of its activity in the future.
2. Collect information about existing and projected community noise levels.
3. Evaluate noise levels as these affect existing and planned development.
4. Establish a set of Objectives, Principles and Action Programs to guide future public and private planning to maintain desired levels of quiet in the community.

TECHNICAL ASPECTS OF SOUND

A. Definition of Sound

Sound is a result of vibrating air pressure generated by motion. The passing of a truck or jet airliner, the movement of train wheels over rails, or the working of auto engines generate sound waves that move through the air similar to waves in water. In sound, the waves are alternate rings of compressed, and then rarefied, air moving away from a source at a constant speed. As each wave encounters an object, it exerts a force — a push, then a pull — on the object. When that object is the human ear, the eardrum vibrates in response to the changes in pressure. Each such vibration is carried ultimately to the brain where it is interpreted as a sound. Sounds vary in intensity (loudness), frequency (pitch), incidence (constant vs. intermittent), and complexity (purity of pitch). Sound, in itself, is a value neutral concept.

B. Definition of Noise

Noise is an evaluation of sounds. Noise is generally thought of as unwanted sound or as sounds of no or negative value.

Judgments about which sounds are noise sometime vary by experience, learning, or activity. Strange sounds are more often responded to as noise than are familiar sounds. Random sounds are more disturbing than predictable sounds. Sudden noises are more threatening than gradually increasing noises. Sounds which occur during activities requiring quiet are perceived as noisier than a sound of the same intensity occurring during a more active period. The alarm clock may seem to be noisier than the five o'clock whistle. The music that is beautiful to the hi-fi enthusiast may be noise to the neighbor.

In spite of this potential variability, research indicates that a degree of consensus exists that loud sounds, high-pitched sounds, pure sounds and intermittent sounds are the "noisiest."

C. The Measurement of Sound

Sound is measured by decibels. The zero (0 dB) on the decibel scale is based on the quietest sound level that the healthy, unimpaired human can detect. Because the sound level measuring scale is logarithmic, decibels are not linear units like miles or pounds; rather, they are representative points on a sharply rising curve. Thus, 10 decibels is 10 times more intense than one decibel; 20 decibels is 100 times more intense (10×10).

The human ear can detect a wide range of sounds. The gentle rustle of leaves, for example, is rated at 10 decibels. The typical office contains about 50 decibels of background noise. Moderate traffic noise ranges around 70 decibels. A police whistle hits 80. Subways and elevated trains rank just below thunder at 100 decibels. At 120 decibels the ear begins to feel pain.

Though people respond differently to sounds of high and low pitches (frequencies), research has found that the "A" pitch is most consistent with people's perceptions of loudness. Sound measuring meters, therefore, are equipped with "filters" which weight the sounds received at various frequencies to produce a uniform "A" scale reading. Most meters can also be adjusted to filter for other frequencies ("B" or "C") as well. Resulting sound levels are referred to as dBA, dBB, dBC, etc., in accord with the scale selected. The "A" scale is the most commonly used standard in assessing and comparing community noise levels from different sources.

D. Measurement Scales

Since the vast majority of sounds occur over a period of time (incidence) it is necessary to establish scales to indicate the important dimensions of a noise. Within a time period noises may vary. For some purposes, such as assessing maximum noise levels for highways, peak traffic periods might be of most concern. Measurements could be taken, therefore, during the morning and evening rush hours. For other purposes, it might be more important to direct attention to the time period of occurrence of noise sensitive activities. If a school or some other facility were used only between 9:00 a.m. and 3:00 p.m., then noise levels associated with peak hour traffic flow would not be a great utility. In residential areas, it might be more important to direct attention to the evening hours during which more people are customarily "at home" and during nighttime hours when sleep could be disturbed by excessive noise levels.

A variety of scales have been developed which offer advantages and disadvantages. A series of percentile scales (L_{10} , L_{50} , L_{90}) express noise levels exceeded some percentage of the time (e.g., 10%, 50%, or 90%) during any period. L_{90} tends to indicate general background (ambient) noise levels. L_{50} indicates typical or median levels. L_{10} represents peak levels and is often used as the design criteria level for highway construction projects. L_{dN} is a scale which assigns a 10 dBA "penalty" for nighttime noise.

CNEL (Community Noise Equivalent Level) is a scale devised by the State of California and employed in the recently enacted State Housing Act. This scale divides the 24-hour day into three periods (day, evening and night) with progressive penalties for evening and nighttime noise. Title 4 of the Administrative Code defines daily CNEL as follows:

"Daily Community Noise Equivalent Level (CNEL): Community noise equivalent level, in decibels, represents the average daytime noise level during a 24-hour day, adjusted to an equivalent level to account for the lower tolerance of people to noise during evening and nighttime periods relative to the daytime period. Community noise equivalent level is calculated from the hourly noise levels by the following:

$$CNEL = 10 \log \frac{1}{24} \left[\text{antilog} \frac{HNLD}{10} + 3 \sum \text{antilog} \frac{HNLE}{10} + 10 \sum \text{antilog} \frac{HNLN}{10} \right]$$

"Where

HNLD are the hourly noise levels for the period 0700-1900 hours;

HNLE are the hourly noise levels for the period 1900-2200 hours;

HNLN are the hourly noise levels for the period 2200-0700 hours;

and means summation."

SOURCES OF NOISE

There are five categories into which the major sources of noise in urban areas can be divided:

- . Transportation
- . Industrial Activity
- . Construction Activity
- . Heating, Ventilating and Air Conditioning Equipment
- . Man — Environment Interaction

Within each category there are many individual types of noise sources.

Transportation Noise

A. Railroad Noise

Railroad transportation noise includes the clanking and rattling of train operations on the tracks, the sounds of braking, the squeal of wheels going around curves, the whistles and the release of air brake pressure after the train has stopped. Trains are particularly noisy on elevated structures which are more effective sound radiators than concrete or earth trackbeds at ground level or below ground. Fremont contains a substantial mileage of railroad lines operated by the Southern Pacific, the Western Pacific and BART.

B. Highway Noise

Trucks have a particularly serious impact in traffic noise. In both diesel and gasoline operated trucks, exhaust sounds can be a source of noise. In diesel trucks, the engine noise is often apparent as it is radiated from the engine through a louvered, sheet metal hood. Truck transmissions and differentials radiate a considerable amount of gear noise. A chain drive radiates noise which has a readily identified whine and is a frequent source of complaint associated with earth-moving trucks. Other sources of noise from trucks include: chassis noise, springs, brakes, air compressors, sheet metal parts, chains and loose pins ("key jangle noise"), and tire whine. Tire noise is usually heard adjacent to highways and in perimeter residential areas where background noise levels are much quieter than the center city and truck speeds exceed 35 miles per hour. Until tires are produced without vacuum cup treads, reductions in truck generated noise will be difficult.

The relative importance of trucks as a contributing factor to noise generation can be seen when it is pointed out that an increase from 50 trucks to 100 trucks on a roadway section produces the same dBA increase as increasing all traffic from 5,000 to 10,000 vehicles.

Automobiles generate considerably less noise in normal operation than do trucks, but they can, when operated at high speeds, be major noise generators. The noises at high speed include tire squeal, tire tread noise, rattles, engine noise and exhaust. At low speeds automobiles are noted for their engine and horn noise. The use of "cutouts" on exhaust systems is illegal and is not as common now as earlier years. Use of resonant "Hollywood" muffler systems causes loud noise during starting sequences.

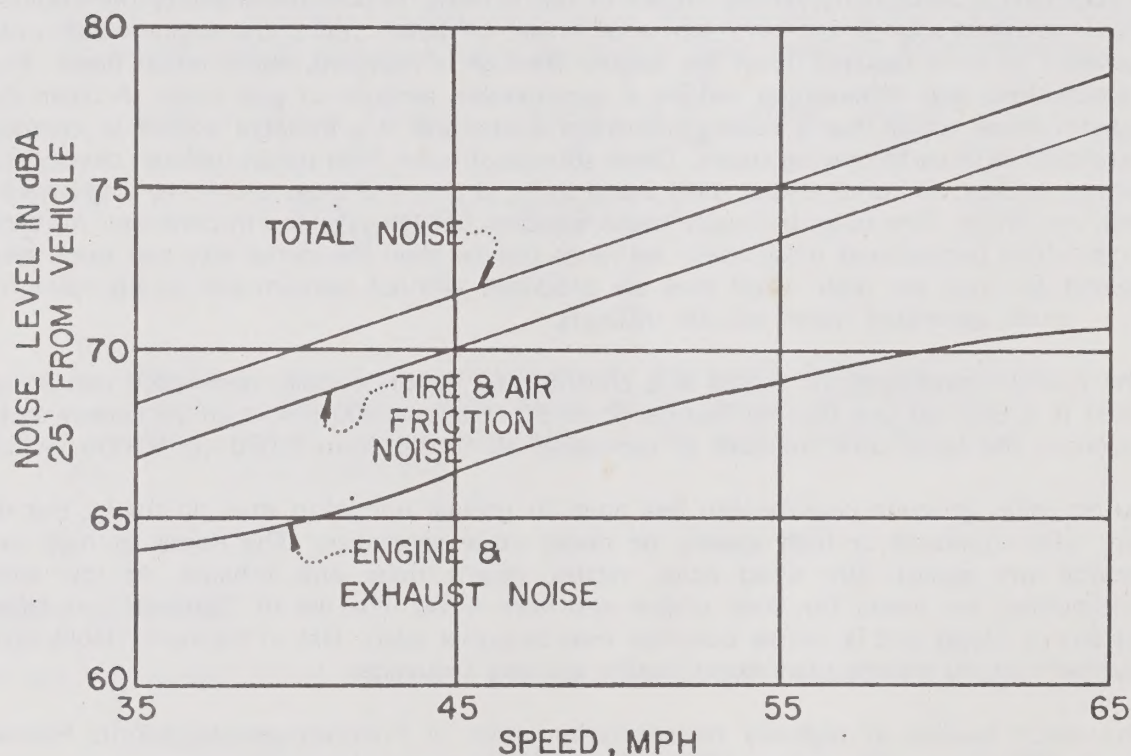
The major sources of highway transportation noise in Fremont are the Nimitz Freeway, Route 680, Route 84, Route 238, and the City's major thoroughfares.

C. Roadway Characteristics

Highway noise includes the character of the roadway itself and composition of vehicle stream. The location of the roadway is most important relative to the surrounding land use. Land configuration is significant in that it will effect the physical spacing among vehicles. Roadway elevation and other design features in the vehicle right-of-way are important since they can

effect sound propagation. Noise emanating from tire/surface interface is an important factor at speeds in excess of 35 miles per hour. Variations in sound intensity are noticeable over a range of common pavement surface types. An especially smooth surface might reduce noise by 5 dBA while an exceptionally rough asphalt might increase noise by 5 dBA.

The number of vehicles per unit time which traverse the given roadway section is an important factor in determining noise generation. Figure 1 indicates that sound intensity changes with vehicle speed. The figure also illustrates the relative proportions of noise generated by the tire/surface interface and aerodynamics compared to the total engine and exhaust components. For speed in excess of 35 miles per hour, the majority of the noise is generated by aerodynamic friction and the tire surface interface. Therefore, if an ideal noiseless engine could be designed, very little benefit will be realized for total highway noise where vehicle operating speeds are in excess of 35 miles per hour occur.



Source: "Analysis of Highway Noise", C. Michael Hogan, Water, Air, & Soil Pollution, Vol. 2, No. 3, September 1973.

Vehicle operation characteristics should also be considered — the gears in which vehicles are operating and the extent of braking and accelerating. Normally, these factors are governed by grade, location of traffic controls, and location of ramps. A rule of thumb of estimating truck noise generation increase due to increased grade is to add 2 dBA if the gradient is 3-4%, add 3 dBA if it is 5-6%, and add 5 dBA if the gradient is 7% or greater. Also, as a rule of thumb, when traffic flow is interrupted by stops and starts, between 2 and 4 dBA may be added to noise generation depending on the truck/auto mix.

A final phenomenon which should be mentioned is reflection. From acoustically hard surfaces such as bare earth or concrete, 90% of acoustic energy may be reflected. This reflected sound energy can be significant at certain receptor sites depending upon the geometry being analyzed. It is possible, therefore, that a solution to noise in one location through construction of a barrier might worsen the problem for neighboring unshielded lands.

D. Air Transport Noise

Air transport noise has received a large share of attention recently. Aircraft noise affects different parts of the City in different ways. To those living near the airports or on runway center line extensions, the sounds of aircraft landings and takeoffs interfere with many daily activities. To those who do not live quite so close to the airport boundaries, the noise from the aircraft flying overhead and to one side or the other, can be a source of distraction. A particularly noisy aircraft is the helicopter which is used to ferry passengers downtown in some cities. Ground equipment may at times be a source of noise annoyance near airports, but this is usually of much less severity than the actual aircraft operation. Airports, it must also be remembered, generate ground traffic.

Fremont does not contain a commercial aviation facility at the present time, though an airport of significant size is planned for the Baylands area. Flyovers from the San Jose, Oakland and San Francisco Airports do not generate noise of problematic levels. Noise from the City's two smaller general aviation airports in the Industrial area is not seen as a major problem.

Industrial Noise

A fully enclosed industrial plant can generate noise which often reaches residential and commercial neighbors. Sources include: air intake and discharge ducts, openings from fans and compressors or valves, engine intakes and exhausts, pumps, steam discharge noise, punch presses, machine tools, forging equipment, and printing presses.

Other major industrial noise sources are out-of-doors yard operations. These include storing and warehousing of steel and lumber, steel yards, and truck and rail freight handling yard. Another industrial noise source which is also interrelated with transportation is plant automotive traffic during shift changes. Employees leaving and arriving at other than daylight hours can be a source of complaint. The majority of Fremont's planned industrial activity is located in the Industrial area in the southern portion of the City. Smaller industrial sites elsewhere in the City are nearer residential areas and may be a source of some concern.

Construction Noise

Diesel engine operated equipment is the major noise generator at construction sites. These engines may be used to drive generators, trucks, shovels, bulldozers, frontloaders, scrapers, and rock drills. Air compressors and suction pumps are both loud and unpleasant noise sources at construction sites. Pile driving is one of the most persistent and unpleasant noises around a construction site. Riveting and electrical or pneumatic nut drivers are also common construction site noise sources. Material handling equipment at the construction site is often a problem.

Construction noise includes both demolition and construction work in which handling of materials and scrap or the use of scrap material chutes results in unpleasant noise. Material handling also includes elevators and cement mixers. Interior finishing and residential construction of wood frame design involve the use of hammers, power saws, and electric drills. In the context of community, these can be sources of unpleasant and annoying noise. Construction noise of fairly high levels, however, is often tolerated without complaint because it is understood to be temporary.

In a relatively new City like Fremont, construction sites are distributed fairly uniformly around the City with the exception of the older community areas of Centerville, Irvington, Niles and Mission San Jose.

Heating, Ventilating and Equipment Noise

The most common center City noise source in the air-conditioning category is the cooling tower. Cooling towers contain two noise sources — fans and water spray. The intakes and discharges of major air-conditioning systems for apartments, hotels, offices and various commercial buildings (including theaters, restaurants and stores) can be just as annoying as their industrial counterparts. Pump noise associated with hot water circulators, chilled water systems, and domestic hot water supply can be effective noise generators. They also operate as efficient vibration generators, and the piping conveys the vibrations to walls or floors which radiate the noise into the surrounding air. Window and attic residential ventilating fans, especially of large size, can be a source of annoying noise. This noise can be magnified by certain types of installation which cause the window or attic itself to vibrate and to radiate the sound. The increasing use of window or through-the-wall packaged air-conditioning units leads to the generation of noise outside the apartment or office which is being cooled. This can create unpleasantly loud noise levels between adjacent structures when one structure uses open window ventilation.

Man — Environment Interaction Noise

Many noise sources in this category are involved with day-to-day activities such as leisure, entertainment, work in a home workshop and use of tools. Outdoor activities of residential areas include the use of power mowers, power hedge trimmers and power operated chain saws. Also, in this class are the home auto repairman with the noise of the work itself and the noise of the runup. Noise emanate from delivery trucks, ambulances, police and fire vehicles.

Refuse collection is generally noisy and disturbing. Noise sources are the handling of trash cans, engine exhaust noise, and truck operated loaders and compactors. Children at play, whether in school yard, playground, on the street, or in the neighbor's yard, are often noisy and to some a source of annoyance. Barking dogs yield frequent complaints.

Ambient Noise Levels

The urban noise environment consists of combinations of sounds resulting from all of the activities above. Ambient noises (the relatively constant background noise characterizing an area) are so blended from a variety of sources that they usually are not perceived as coming from anywhere and are taken for granted. It is when a sound is perceived above the ambient level and, therefore, represents a change that people often respond with complaints.

At the present time, little is known about ambient sound levels in Fremont. The City has not yet had the opportunity to conduct a field sound survey to make these determinations. Typical ambient levels, however, are reported by the League of California Cities in connection with their Model Noise Ordinance as follows:

Sound Level A, decibels

Community Environment Classification

<u>Zone</u>	<u>Time</u>	<u>Very Quiet (rural, suburban)</u>	<u>Quiet (suburban)</u>	<u>Slightly Noisy (suburban-urban)</u>
R1 and R2	10 pm to 7 am	35	40	45
"	7 pm to 10 pm	40	45	50
"	7 am to 7 pm	45	50	55
R3 and R4	10 pm to 7 am	40	45	50
"	7 am to 10 pm	45	50	55
Commercial	10 pm to 7 am		50	55
"	7 am to 10 pm		55	60
M1	anytime		65	65
M2	anytime		70	70

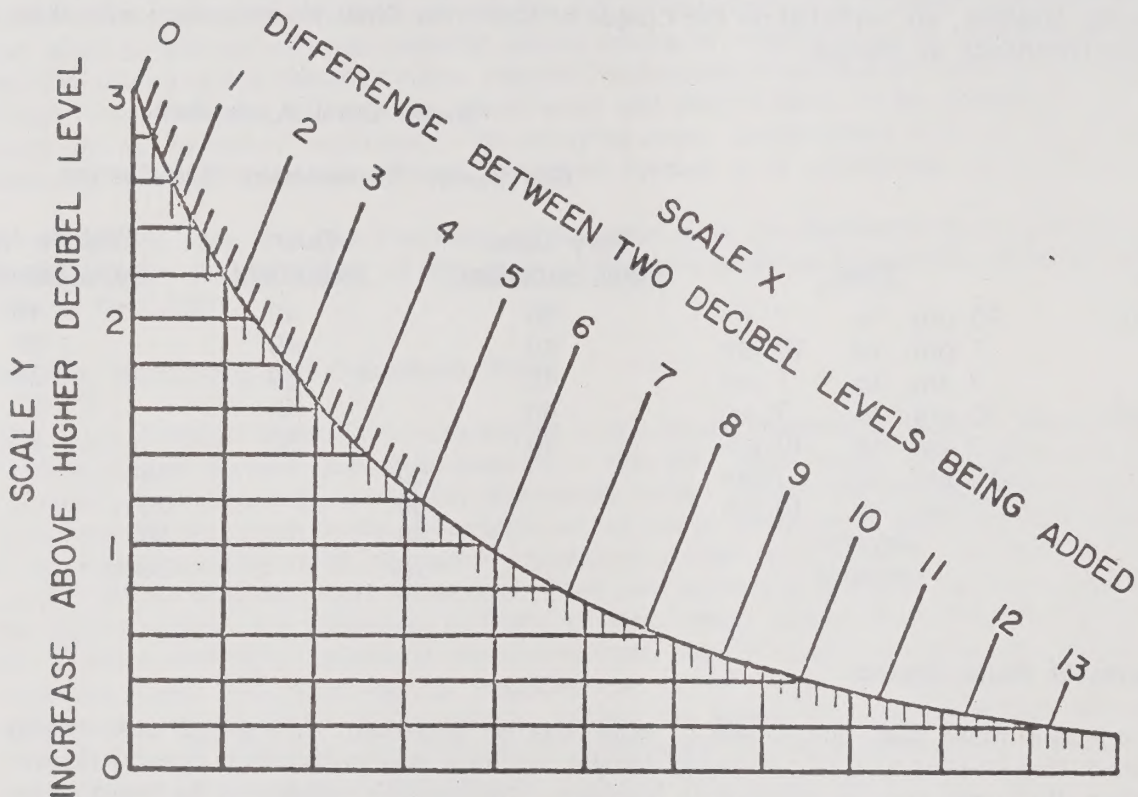
Combinations of Noise Sources

In many locations more than one source of noise can be identified. At a bridge overcrossing the noise from two streams of traffic coincide. Parallel rail lines may exist within close proximity to each other. Rail lines may lie adjacent to highways. Construction noises may be heard above existing manufacturing plant noise levels during a period of plant expansion.

A combination of two or more noises clearly will yield a noisier environment than would the same noises if they existed separately. Because of the logarithmic base of the decibel scale, however, combinations of sounds do not yield a total noise which is their simple sum. Two sounds of 50 decibels each do not combine to total 100. Rather, they produce a combined noise level of 53 decibels. Combining two equal sound levels will always yield an increase of 3 decibels. Combining two unequal sounds will add less than 3 decibels to the louder sound. A 90 decibel sound in combination with an 84 decibel sound yields a total sound of 91 decibels.

The following figure provides a simplified method for combining sounds:

CHART FOR COMBINING LEVELS OF UNCORRELATED SOUNDS



NOISE ABATEMENT TECHNIQUES

The techniques available to mitigate excessive noise levels are as varied as the sources and situations generating noises themselves. The primary obstacle to abating noise would appear to be a lack of a sense of need to change rather than a lack of means available. Experience shows that where there is consumer demand for quieter products or where a quieter product would contribute to product differentiation in a highly competitive market, suppliers are usually eager to make available the product demanded.

In general, it is convenient to deal with noise mitigation measures according to their place in the source — path — recipient process.

Source

Noise abatement strategies which could mitigate excessive noise related to transportation sources include: (1) placement of the line of travel in locations where the source will be more compatible with adjacent uses; (2) reducing or avoiding increases in speed in areas where noise is critical; (3) reducing, avoiding increases, or rerouting truck traffic; (4) avoiding unnecessary interruptions in traffic flow; (5) reducing or avoiding increases in traffic density in areas where noise is critical; (6) employing smooth-textured roadway surfaces; (7) employing techniques of vertical separation such as depressing roadways; and (8) avoiding unnecessarily steep gradients especially where trucks are likely to be involved. These actions are available to cities through their own public works programs and projects.

Other measures are of significance primarily at the Federal and State levels of government. These would include: (1) requirements setting exhaust noise levels and more effective muffling of intake and exhaust noise; (2) the use of direct mechanical devices in place of chains and cables; (3) padding and cradling metal to metal contact points; (4) altering tire tread and railroad car wheel designs; (5) shielding and modifying brake release valves; (6) use of materials with more of a sound-dampening ability; (7) use of materials with more resistance to vibration and resonance; and (8) required inspections to insure continued functioning of noise reduction devices.

Measures which deal with industrial, construction site and home use noise sources primarily focus on the type and operating character of the equipment used. Less noisy trucks, minimizing outside activity, off-site prefabrication, the utilization of better muffling, and more effort on equipment maintenance can reduce noise generation.

Path

Mitigation measures dealing with the path which sounds might follow involve shields, baffles or barriers. In general, the more massive the shield, the more effective it will be. Barrier walls — of sufficient height to block the line of sight and of sufficient length to mask the total passage of a moving source of noise — erected between the source and the recipient can be effective means of lowering sound levels by an amount up to about 15 decibels. Depressing a roadway — using the surface of the ground as a barrier — also is capable of reducing sound levels by as much as 15 decibels. For construction sites, the use of temporary barriers has been found effective in some applications. Existing structures, if they intervene between the noise source and the recipient, can have a noise reduction affect though the amount of reduction is limited to 10 decibels. Two or three rows of houses along a street frontage will shield the remaining units though such a strategy would not be recommended unless other actions were taken to mitigate noise impacts for those first houses. Landscaping alone is a relatively ineffective sound barrier. A row of trees at least 15 feet tall and sufficiently dense to block the line of sight can yield noise reductions of up to 5 decibels.

The structure within which the recipient is located can reduce noise. As indicated in the following table, building type and window condition are significant factors:

<u>Building Type</u>	<u>Window Condition</u>	<u>Reduction of Noise from Outside Sources</u>
All	Open	10 dB
Light Frame	Ordinary, sash closed	20 dB
Masonry	Single pane, closed	25 dB
Masonry	Double pane, closed	35 dB

Source: Federal Highway Administration Policy and Procedure
Memorandum 90-2, February 8, 1973

Other sources of noise seepage into a structure would include around doors, through the floor and ceiling, through ventilators, or through fireplace flues especially when left in an open position.

Recipient

The range of mitigation measures which deal with potential recipients of noise are relatively limited. The wearing of ear protectors is a technique used in the aircraft and other industries to deal with extremely high noise levels. Limiting the amount of exposure by requiring breaks, quiet periods and limiting shifts are techniques which limit the total amount of sound energy received though they do not affect noise levels during the time when exposure takes place. Noise production from construction sites can be limited to occur only during those hours when it is least likely to disturb the activities of the hearer.

Site planning can remove the hearer as far as possible from the source, though small increases in distance have little ability to reduce noise. Site planning, however, can be utilized to place the hearer behind structures such as parking garages in order to reduce intrusions into living quarters.

Land use changes are another potential means to remove people engaged in noise sensitive activities from the scene of excessive noise. Considering the acreage in many cities which is exposed to high noise levels and the amount of land needed for the less noise sensitive activities (commercial or industrial uses for instance), this strategy is of limited general use. The extreme consequence of exclusive reliance on land use changes along all of a city's thoroughfares to reduce noise exposure would be to have strip commercial use throughout the city. The secondary noise impacts alone of this approach in terms of vehicle density and traffic flow interruption could exceed the benefits in noise reduction sought in the beginning.

An additional set of factors must also be considered in discussing mitigation measures dealing with the recipient. Since the perception of noise is a subjective process, psychological factors play a part. Sensitivity to noise is influenced by other conditions associated with a particular noise. Truck traffic which generates noise may also cause headlight glare or concerns with safety. Landscaping which reduces glare and which masks the presence of trucks visually can appear to reduce noise by reducing the total annoyance which the hearer associates with the source.

NOISE LEVELS IN FREMONT

Two major purposes of the Noise Element are the collection of data about existing and projected community noise levels, and an evaluation of the impacts of noise on this existing and planned development.

Methodology

Because transportation noise is the major contributor to overall community noise, more information is available about this noise source than for other sources. For this reason, transportation noise has been the major focus of data collection.

Three kinds of transportation noise sources are identified in Fremont: the State route system (Routes 17, 238, 84 and 680), railroads (Western Pacific and Southern Pacific and BART), and local thoroughfares. The locations of each are shown on Exhibit 1.

In accord with the mandate contained in the Government Code (Section 65302g), CalTrans, the Western Pacific Railroad, the Souther Pacific Railroad, and BART each supplied the City with noise level information.

CalTrans provided 500 scale maps with existing and projected (1995) noise contours for levels of 65 dBA or greater on the L_{10} scale. The L_{10} data were converted by staff to CNEL values using the relationship: $CNEL = L_{10} - 3$.

BART supplied 500 scale maps with existing and projected (1995) noise contours for levels of 55 dBA or greater on the L_{dN} scale. These were equivalent to CNEL values.

On neither the CalTrans nor the BART⁴ maps were contours drawn down to 45 dBA in the vicinity of noise sensitive facilities. The likelihood is, however, that ambient levels in these locations would approximate 45 dBA. If this were the case, it would be difficult to distinguish the noises from transportation sources from the general background noise levels.

The Western Pacific and Southern Pacific Railroads supplied the City with raw base data on the number of trains per day, length of train, speed and grade conditions. Employing a methodology also supplied by the railroads,⁵ CNEL contour distances were calculated. Both railroads indicated that they expected future noise levels not to exceed present levels. Any increases in noise resulting from expanded operations they felt would be offset by new Federal design standards.

In order to estimate existing noise levels adjacent to the City's thoroughfares, a nomograph method developed by the Federal Highway Administration⁶ was utilized. The basis of employing this technique is information on average speed,⁷ truck traffic,⁸ and peak-hour traffic volume.⁹ No attempt was made to determine projected 1995 levels based on existing information. This task is more appropriately undertaken upon completion of the City Council authorized Freeway Deletion Traffic Study which will provide more accurate traffic predictions for the year 1995.

In all of the noise contour information referred to above, it must be pointed out that the effects of barriers, shields, intervening structures or topography outside of the right-of-way were not taken into consideration. The reported contours, therefore, are likely to overestimate the actual situation in many locations.

Findings

A. Summary

There are at present noise levels greater than 65 dBA on all the State routes (Routes 17, 84, 238 and 680) passing through the City. The impact of these unacceptable noise level corridors varies from about 2,000 feet to 1,100 feet on Route 17, from 800 to 350 feet on Route 84, 600 to 350 feet on Route 238, and 1,000 to 1,200 feet on Route 680, depending upon the geometry being considered.

Noise levels emanating from operations on the Southern Pacific, Western Pacific, and BART railroad lines in the City are generated by trains passing through the City. The width of the corridor where noise levels exceed 65 dBA on these railroads varies between about 700 and 300 feet depending upon the particular situation being considered.

Noise levels in excess of 65 dBA occur along most of the City's major thoroughfares with the width of the resulting corridor being as wide as 1,400 feet along the more heavily traveled portions of Fremont Boulevard.

The combined effect of these highways, rail lines and local streets on the noise environment of the City is depicted on Exhibit 2.



FREMONT GENERAL PLAN

NOISE ELEMENT

Transportation Noise Sources

LEGEND

- STATE ROUTE
- - - LOCAL THOROUGHFARE
- RAILROAD
- . - B.A.R.T.

— — — — — FREMONT CITY LIMIT

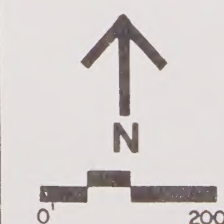


EXHIBIT 1

SOURCE: SEE SECTION ON
METHODOLOGY

FREMONT GENERAL PLAN

NOISE ELEMENT

Transportation Noise Corridors

LEGEND

 65 dBA (CNEL) or greater

 FREMONT CITY LIMIT




0' 2000'

EXHIBIT 2

SOURCE: SEE SECTION ON
METHODOLOGY



B. Northern Plain Area

1. Major Noise Sources

The single most dominant noise source at the present time is the Nimitz Freeway. Fremont Boulevard, the Southern Pacific Railroad and the future Dumbarton Freeway are also significant. Paseo Padre Parkway east of Fremont Boulevard has relatively low traffic volumes at the present time but can be expected to increase in the future. The circulation system for the large area west of the Nimitz is indicated on the Circulation Element of the General Plan as being subject to further study. Consideration has recently been given to modifying the interchange pattern between the Nimitz Freeway, Fremont Boulevard and Paseo Padre Parkway. This would affect noise generation in the vicinity.

2. Noise Levels

The Nimitz Freeway is at the present time, and is expected to be in the future, the major source of noise. The 65 dBA contours at the present time cover a corridor approximately 2,000 feet wide. Projected noise levels would extend this corridor to 2,600 feet. The remaining noise corridors are 800 feet wide or less.

3. Land Uses

While the area west of the Nimitz is largely undeveloped at the present time, existing residential development, including the trailer park, falls within the potential noise corridor. The effectiveness of the noise barrier walls in these locations can be presumed to reduce noise by up to 15 decibels. To the east of the Nimitz is additional single family development. Along Paseo Padre Parkway, a masonry wall provides protection from noise. Several areas in the Northern Plain, however, are not adequately shielded. Alviso School is expected to be impacted by high noise levels.

Since future land uses, holding capacity, and circulation in the Northern Plain are currently under review, it is not possible to evaluate future noise impacts for much of the area. The replanning of the Northern Plain necessitated by the deletion of the Shoreline Freeway, however, will provide the opportunity to design the area in a manner which can effectively reduce noise impacts.

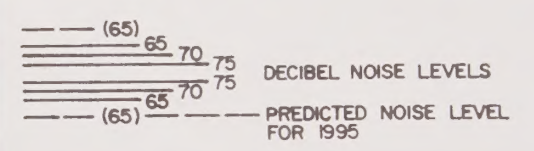


FREMONT GENERAL PLAN

NOISE ELEMENT

NORTHERN PLAIN

LEGEND



- ELEMENTARY SCHOOL
- JUNIOR HIGH SCHOOL
- HIGH SCHOOL

- NEIGHBORHOOD PARK
- HISTORICAL PARK
- COMMUNITY PARK

- PLANNING AREA BOUNDARY
- FREMONT CITY LIMIT



SOURCE: SEE SECTION ON METHODOLOGY

C. Centerville Area

1. Major Noise Sources

The Nimitz Freeway, Route 84 (Thornton-Fremont-Peralta), Fremont Boulevard, Blacow Road, Central Avenue, Paseo Padre Parkway, BART and the Southern Pacific Railroad are major noise sources. Future extension of Route 84 (Dumbarton Freeway) and construction of Route 238 (Foothill Freeway) would become significant noise generators if constructed.

2. Noise Levels

The noise corridor presently surrounding the Nimitz Freeway has varying widths as it passes along the Centerville Area. Between Decoto Road and Thornton Avenue the corridor measures 2,000 feet. Between Thornton Avenue and Central Avenue, however, the roadway is depressed resulting in the narrowing of the 65 dBA corridor to approximately 800 feet. Beyond Central Avenue the roadway rises and the corridor expands again to approximately 1,600 feet. The Southern Pacific Railroad corridor through Centerville is approximately 900 feet wide. It is important to note that several at-grade crossings exist in the Centerville Area necessitating the blowing of train whistles and noise from warning bells at crossing gates. Fremont Boulevard carries heavy traffic loads in Centerville especially as it approaches Mowry Avenue. Between Central Avenue and Thornton numerous interruptions to the free flow of traffic contribute to noise levels.

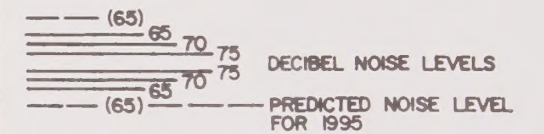
3. Land Uses

The major portion of the Centerville Area is developed at the present time. A number of neighborhoods along the Nimitz Freeway are subjected to high noise levels — especially from trucks which constitute approximately 13% of the traffic along this route. Noise mitigation in such areas will depend primarily on the efforts of the individual homeowner and the State. Cabrillo and Norris Elementary Schools and Thornton Junior High School may be affected by rising noise levels in the future. The planned City-wide park in the quarry area would be impacted by noises from BART and from future Routes 238 and 84.

FREMONT GENERAL PLAN

NOISE ELEMENT CENTERVILLE

LEGEND



- ELEMENTARY SCHOOL
- JUNIOR HIGH SCHOOL
- HIGH SCHOOL

- NEIGHBORHOOD PARK
- HISTORICAL PARK
- COMMUNITY PARK

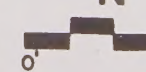
- HOSPITAL
- CONVALESCENT HOSPITAL

PLANNING AREA BOUNDARY

FREMONT CITY LIMIT



N



SOURCE: SEE SECTION ON METHODOLOGY



D. Niles Area

1. Major Noise Sources

Route 238 (Mission Boulevard) and Route 84 (Niles Canyon Road), the Southern Pacific and Western Pacific Railroads, and BART are the major sources of existing noise. Future Route 238 (Foothill Freeway) would add to noise levels along its right-of-way but might reduce levels along Mission Boulevard.

2. Noise Levels

The 65 dBA noise corridors around each of these sources vary from a width of 300 to 600 feet. Convergence of several of the major noise generators in the vicinity of Mission Boulevard and Alameda Creek increases noise levels in that location by as much as 6-12 decibels. No information was available to estimate noise levels associated with the Niles rail yard operation.

3. Land Uses

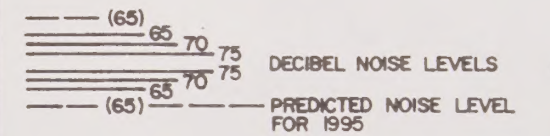
A variety of land uses (Industrial, Commercial, Residential, Open Space) occur in proximity to different segments of the noise corridors. Convalescent hospitals along Mission Boulevard experience high noise levels.

FREMONT GENERAL PLAN

NOISE ELEMENT

NILES

LEGEND



- ELEMENTARY SCHOOL
- JUNIOR HIGH SCHOOL
- HIGH SCHOOL

- NEIGHBORHOOD PARK
- HISTORICAL PARK
- COMMUNITY PARK

- HOSPITAL
- CONVALESCENT HOSPITAL

PLANNING AREA BOUNDARY

FREMONT CITY LIMIT



SOURCE: SEE SECTION ON
METHODOLOGY



E. Central Area

1. Major Noise Sources

Because of its central location and its function within the overall City, all of the major thoroughfares in the Central Area are significant sources of traffic noise. In addition, BART and the Southern Pacific and Western Pacific Railroads generate noise. Future extensions of BART and the construction of Route 238 (Foothill Freeway) would add to these existing noise sources.

2. Noise Levels

The estimated width of the 65 dBA corridor around Fremont Boulevard varies from 1,100 to 1,500 feet. The Mowry corridor varies from 600 to 800 feet. The remaining corridors are somewhat narrower as a result of lower traffic volumes. Noise levels can be expected to be somewhat higher at intersections due to the interruption of traffic flow. Based on the noise contours supplied by the State for the stub of future Route 238 where it leaves Route 680, it is estimated that a noise corridor of some 1,600 feet might exist around future Route 238 as it passes through the Central Area.

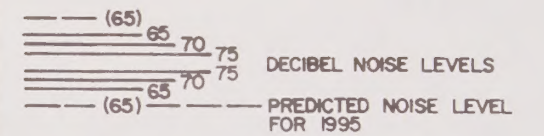
3. Land Uses

The predominant land uses in the Central Area are high density Residential, Commercial, Office, Medical and Institutional. Many of these uses do and will be climate controlled resulting in significant traffic noise attenuation. Cooling devices themselves, however, can contribute to noise levels. Central Park is expected to be impacted by significant noise levels as a result of a future BART extension and construction of Route 238. These would add to the noise from the existing railroad and thoroughfare sources. Central Park also can be considered a noise generator — particularly in its eastern extension planned to contain facilities for more organized sports.

FREMONT GENERAL PLAN

NOISE ELEMENT CENTRAL

LEGEND



- ELEMENTARY SCHOOL
- JUNIOR HIGH SCHOOL
- HIGH SCHOOL

- NEIGHBORHOOD PARK
- HISTORICAL PARK
- COMMUNITY PARK

- HOSPITAL
- CONVALESCENT HOSPITAL

PLANNING AREA BOUNDARY

FREMONT CITY LIMIT



SOURCE: SEE SECTION ON
METHODOLOGY



F. Mission San Jose Area

1. Major Noise Sources

Routes 680 and 238 (Mission Boulevard), and the Western Pacific Railroad are the major generators of transportation noises in the Mission San Jose Area.

2. Noise Levels

Route 680 provides a good illustration of the manner in which the relationship between the surface of the roadway and adjacent topography can influence sound propagation. An undulating pattern of contours form a noise corridor which varies from 600 to 2,000 feet between Paseo Padre Parkway and the eastern City limits.

3. Land Uses

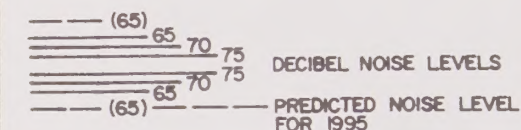
Residential uses either exist or are planned in the vicinity of these traffic noise sources. Recent construction along Mission Boulevard has involved the use both of backup residential lots and a frontage road scheme. Lots with the masonry barrier should be better protected from traffic noise, while the frontage road may produce a more desirable visual environment. On-going studies in this area will consider these tradeoffs. Noise levels were a factor considered in the site planning work conducted in connection with the Advance Plan Area I Studies for Mission Hills West. Olivos School is located within a high noise area.

FREMONT GENERAL PLAN

NOISE ELEMENT

MISSION SAN JOSE

LEGEND



- ELEMENTARY SCHOOL
- JUNIOR HIGH SCHOOL
- HIGH SCHOOL

- NEIGHBORHOOD PARK
- HISTORICAL PARK
- COMMUNITY PARK

PLANNING AREA BOUNDARY

FREMONT CITY LIMIT



0 2000'

SOURCE: SEE SECTION ON
METHODOLOGY



G. Irvington Area

1. Major Noise Sources

The Nimitz Freeway (Route 17), the Southern and Western Pacific Railroads, and local thoroughfares are the major traffic noise generators in this area. At-grade rail crossings add the noise of warning bells and train whistles. The planned BART extension would create an additional noise source at a future date.

2. Noise Levels

The Nimitz Freeway has the widest 65 dBA or greater corridor in the Irvington Area, ranging from 1,200 to 1,800 feet in width. Future projections would extend this corridor to a width of as much as 2,500 feet. Fremont Boulevard has a corridor varying from 500 to 1,500 feet in width with added noise resulting from traffic flow interruptions and congestion at points along its length.

3. Land Uses

Residential uses along the Nimitz Freeway are experiencing significantly high noise levels at the present time with increases predicted for the future. Attenuation in these already developed areas rests primarily with individual homeowners and the State. Planned circulation improvements in the "five corners" area should improve traffic flow in that location with resultant noise reduction. Marshall Elementary School can be expected to be affected by noise in the future.

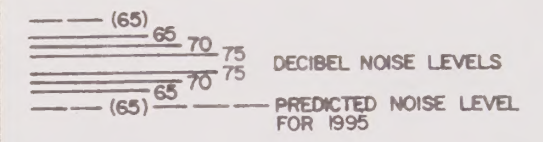


FREMONT GENERAL PLAN

NOISE ELEMENT

IRVINGTON

LEGEND



- ELEMENTARY SCHOOL
- JUNIOR HIGH SCHOOL
- HIGH SCHOOL

- NEIGHBORHOOD PARK
- HISTORICAL PARK
- COMMUNITY PARK

- HOSPITAL
- CONVALESCENT HOSPITAL

- PLANNING AREA BOUNDARY
- FREMONT CITY LIMIT



SOURCE: SEE SECTION ON METHODOLOGY

H. Warm Springs Area

1. Major Noise Sources

Route 680, Mission Boulevard, and Warm Springs Boulevard are the major traffic noise generators at the present time in the Warm Springs Area. The planned extensions of BART, Paseo Padre Parkway and Route 237 would add sources of noise in the future. Located adjacent to Warm Springs is the City's Industrial area. Construction site and operating noise could be a factor in some locations in the future.

2. Noise Levels

Route 680 has a 65 dBA corridor of approximately 600 to 1,300 feet in the Warm Springs Area. Mission Boulevard linking Routes 680 and 17 has a noise corridor associated with it of approximately 1,000 feet. The Durham Road overcrossing will avoid the noises which would otherwise occur if the crossing of the railroad were at-grade.

3. Land Uses

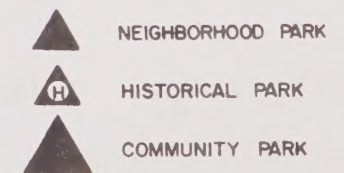
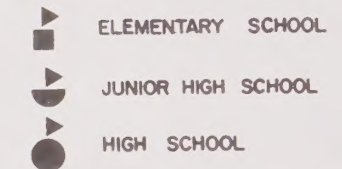
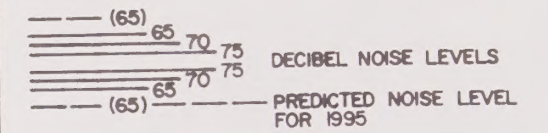
Generally lower density Residential land uses are found along Route 680. Commercial uses are located at the intersection of Mission and Warm Springs Boulevards.

FREMONT GENERAL PLAN

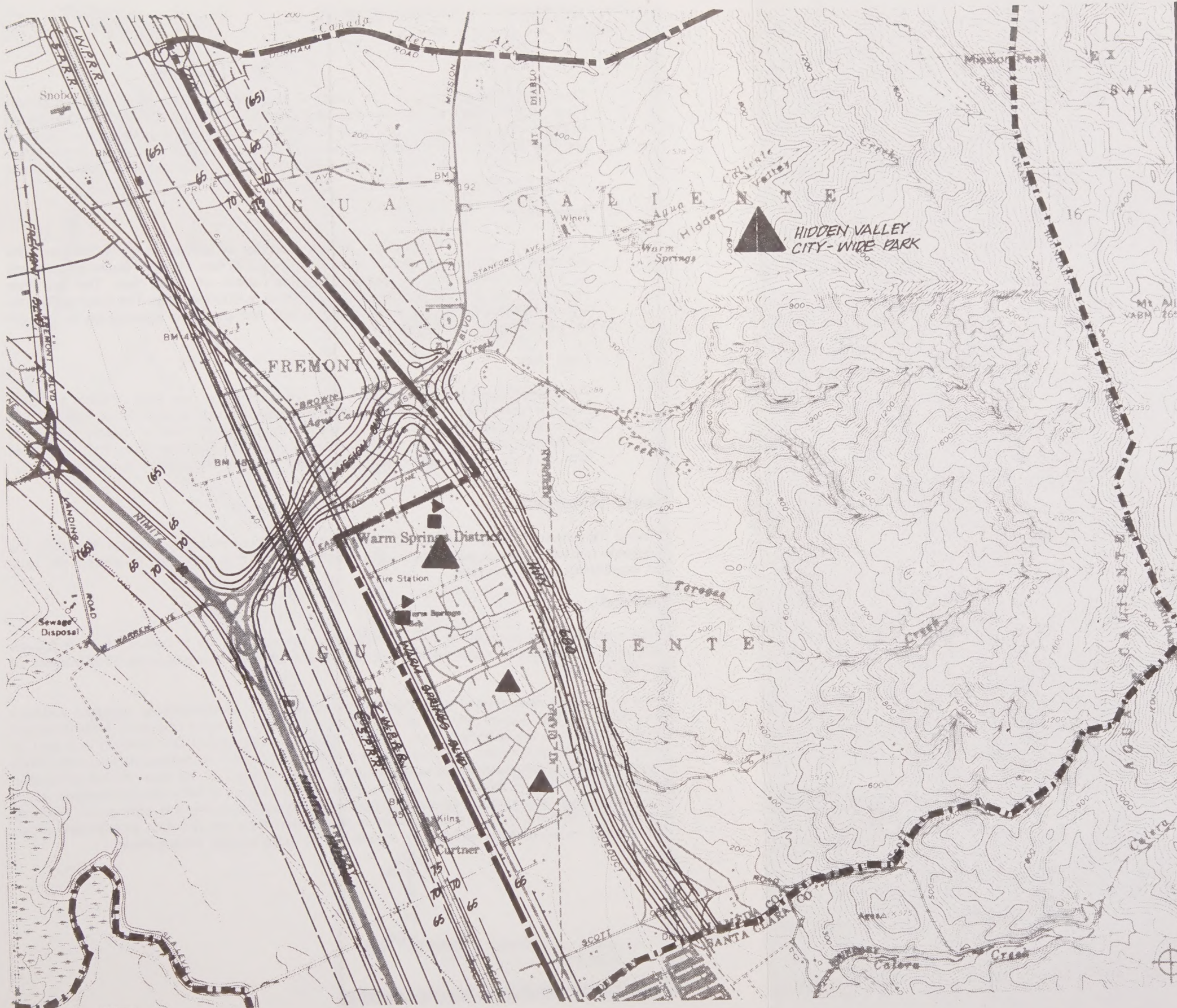
NOISE ELEMENT

WARM SPRINGS

LEGEND



SOURCE: SEE SECTION ON METHODOLOGY



I. Industrial and Baylands Area

1. Major Noise Sources

The Nimitz Freeway (Route 17), Fremont Boulevard (adjacent to the General Motors Plant), the Southern and Western Pacific Railroads, and Route 84 from the Dumbarton Bridge to Coyote Hills are the major sources of transportation noise in the Industrial and Baylands Areas. Substantial construction site noise can be anticipated in the future in the Industrial Area. Existing small airports generate some noise. A planned airport is shown in the Baylands.

2. Noise Levels

Around the Nimitz Freeway is a 65 dBA corridor of approximately 1,000 feet. The projected future corridor width is approximately 2,200 feet. Fremont Boulevard adjacent to General Motors has an estimated corridor width of 1,400 feet. The rail lines penetrating the area are associated with corridors to 600 feet wide. The existing corridor around the Dumbarton approach measures 500 feet though it is projected to increase to 1,600 feet in the future.

3. Land Uses

The planned uses in the Industrial Area are among the uses least sensitive to noise. Ambient levels may at times equal the noise generated by transportation sources. The South San Francisco Bay National Wildlife Refuge is planned to occupy a majority of the Baylands Area and to connect to Coyote Hills Regional Park. Rail noise may have an impact on these recreation areas as will the Dumbarton approach.

NOISE STANDARDS

Having identified the major sources of existing and projected noises and having identified the probable impacts of these noise levels on nearby land uses, it is necessary to address the issue of community noise standards.

Approach

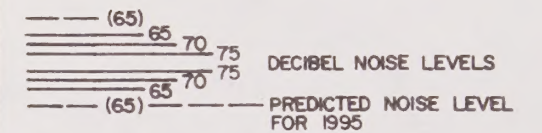
Two approaches can generally be taken to evaluating the acceptability of noises. The first focuses attention on changes in noise levels while the second considers the disruptive consequences of excessive noise.

It is a frequent observation, first, that individuals become accustomed to repeated auditory stimulation so that a given amount of stimulation no longer evokes a response. Ambient sound levels, unless they are extremely high, become taken for granted and are accepted as a part of the individual's environment. Since people are generally not capable of distinguishing sounds unless the difference in their intensity is at least 3 dBA, small increases are generally found acceptable. When a series of small increases occur in a short period of time or when major increases occur, then noise levels are found unacceptable. Two problems with applying this approach in Fremont are that (1) ambient levels are not known at the present time and (2) such an approach allows for gradual noise increases which can accumulate to have serious consequences.

FREMONT GENERAL PLAN

NOISE ELEMENT INDUSTRIAL

LEGEND

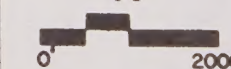


- ELEMENTARY SCHOOL
- JUNIOR HIGH SCHOOL
- HIGH SCHOOL

- NEIGHBORHOOD PARK
- HISTORICAL PARK
- COMMUNITY PARK

PLANNING AREA BOUNDARY

FREMONT CITY LIMIT



SOURCE: SEE SECTION ON METHODOLOGY



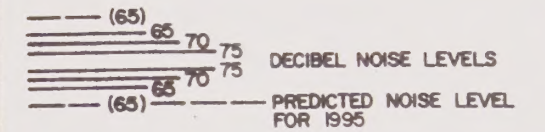


FREMONT GENERAL PLAN

NOISE ELEMENT

BAYLANDS

LEGEND

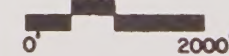
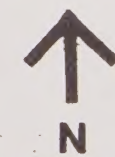


- ▲ ELEMENTARY SCHOOL
- ◐ JUNIOR HIGH SCHOOL
- HIGH SCHOOL

- ▲ NEIGHBORHOOD PARK
- ▲ (H) HISTORICAL PARK
- ▲ COMMUNITY PARK

--- PLANNING AREA BOUNDARY

--- FREMONT CITY LIMIT



SOURCE: SEE SECTION ON METHODOLOGY

The second approach focuses on the consequences of various environmental noise levels in order to judge the severity of potential disruptions. At the highest noise levels (above 90 dBA for eight consecutive hours) either permanent or temporary hearing loss can occur. At high levels of noise (70-90 dBA), indirect physiological effects can occur including fatigue, loss of sleep, and autonomic nervous system dysfunctions. Normal speech can become difficult at these levels as well. Below 70 dBA, annoyance, tension or inefficiency can result from prolonged exposure to noise.

In order to understand these levels, typical noise levels encountered in various locations are illustrated below:

EQUIVALENT NOISE LEVELS IN DECIBELS NORMALLY OCCURRING INSIDE VARIOUS PLACES

Space	dBA
Small Store (1-5 clerks)	60
Large Store (more than 5 clerks)	65
Small Office (1-2 desks)	58
Medium Office (3-10 desks)	63
Large Office (more than 10 desks)	67
Miscellaneous Business	63
Residences:	
Typical movement of people — no t.v. or radio	40-45
Speech at 10 feet, normal voice	55
T.V. listening at 10 feet, no other activity	55-60
Stereo Music	50-70

Established Standards

Based upon considerations of research utilizing both of the above approaches, a variety of Federal, State and regional agencies have adopted noise level standards for various activities and from various sources. The Department of Housing and Urban Development has prepared a report (Noise Assessment Guidelines: Technical Background, HUD Report No. TE/NA172) comparing the various standards employed in this country as well as internationally. Though this report makes it clear that wide variations in standards exist, HUD has published ¹⁰ standards which would appear to be generally applicable to Fremont. In a modified form, these are recommended for adoption as "Principle 1."

When better data is available about existing and projected noise levels based on local field observation in Fremont, and when an assessment can be made of the number of units actually affected by noises of various levels, a more locally sensitive set of standards could be devised and adopted.

Interior Noise

The recently adopted State Housing Act (Administrative Code, Title 25, Article 4) requires the following of non-single family detached residential units:

- “(2) Interior Noise Levels.** Interior community noise equivalent levels (CNEL) with windows closed, attributable to exterior sources shall not exceed an annual CNEL of 45 dB in any habitable room.
- “(4) Vehicular and Industrial Noise Sources.** Residential buildings or structures to be located within annual exterior community noise equivalent level contours of 60 dB adjacent to the select system of county roads and city streets (as specified in Section 186.4 of the State of California Streets and Highways Code), freeways, state highways, railroads, rapid-transit lines and industrial noise sources shall require an acoustical analysis showing that the proposed building has been designed to limit intruding noise to the allowable interior noise levels prescribed in Section T25-1092(e)(2).

Since most residential structures (with windows closed and single pane glass) have the capability of reducing noise levels from exterior sources by 20 dBA, the State’s interior standard of 45 dBA should normally be achieved when exterior levels do not exceed 65 dBA. This would reenforce the levels recommended by HUD.

It should also be noted that implementation of the State act requires that the precise location of the 60 dBA (CNEL) contour be known. Since this information is not generally available, on-site readings would be necessary to determine its location.

EXISTING IMPLEMENTATION TECHNIQUES: CONCLUSIONS

Zoning

The Zoning Code, by specifying the range of uses which are permitted either principally or conditionally in each district, deals with compatibilities between uses of various types. Noise generation/sensitivity criteria should be applied to the Zoning Code to determine whether the uses permitted in each district at the present time are compatible in light of this Noise Element.

Environmental Impact Reporting

The City’s EIR regulations require thorough reviews for those projected judged to have a potentially significant effect on the environment. If a project is likely to result in significant noise generation or if the project would expose persons to noise hazards, mitigation measures are proposed to deal with the impact. At the present time only limited means are available to assure that these mitigation measures are implemented at the time of project execution.

Subdivision Regulations

In order to comply with the new State Map Act of 1975, the City is in the process of revising its Subdivision Regulations. These revisions should include the requirement that the subdivision be designed to include features to reduce excessive noise level to acceptable levels.

Truck Route Ordinance

Section 3-2706 of the Fremont Municipal Code establishes those local streets (in addition to State routes) upon which trucks of over three tons gross weight may normally operate. Since trucks are a prime contributor to high noise levels, existing truck routes should be evaluated in light of this Noise Element.

Performance Standards

Section 8-21904(c) of the Fremont Municipal Code is directed primarily at Industrial land uses as noise generators. These existing standards do not establish acceptable noise/land use compatibilities for the full range of land uses.

FOOTNOTES:

1. In 1830, Philadelphia adopted a Noise Ordinance against horns, trumpets or other blaring instruments. The League of California Cities in 1973 surveyed ordinances adopted by Burbank, Fresno, Glendale, Inglewood, Sacramento, Alhambra, Anaheim, Costa Mesa, Fountain Valley, Los Altos Hills, Palo Alto, Belmont, Paramount, Salinas, San Francisco and Torrence.
2. U. S. Environmental Protection Agency, Laws and Regulatory Schemes for Noise Abatement (December 31, 1971).
3. See Administration Code Title 7, Chapter 1.5; Title 11, Section 415; Title 25, Article 4; Public Utilities Code, Chapter 5, Sections 21669-21669.4; Public Resources Code, Division 13, Sections 21000-21150; Motor Vehicle Code, Sections 23130, 23160; Streets and Highway Codes, Section 216.
4. Both the 500 scale maps supplied by BART and CalTrans are available in the Planning Division for general use.
5. Report WCR 73-5, Assessment of Noise Environments Around Railroad Operations (July, 1973).
6. Method for Prediction of Approximate Highway Noise Levels, Report No. DOT-TSC-FHWA-72-1.
7. City of Fremont Speed Zone Study.
8. Estimated by City staff.
9. 1974 Average Daily Traffic/10.
10. HUD Policy Circular 1390.25.

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